Claims

What is claimed is:

[c1] 1.A method of MR image acquisition comprising:

positioning a subject on a movable table;

entering initial table motion control data and scan parameters;

automatically moving the movable table based on the table motion control data entered;

acquiring MR data based on the scan parameters entered while the movable table is in motion; and

allowing modification of at least one of the initial table motion control data and the scan parameters while automatically moving the table and acquiring MR data.

[c2] 2.The method of claim 1 further comprising providing interactive control of table motion and scan parameters that include control over and adjustment of at least one of: speed of the movable table, direction of table motion, and pulse sequence for MR data acquisition.

[c3] 3.The method of claim 1 wherein the step of acquiring MR data includes ability to continuously scan while the movable table is in translation using a multi-planar fast imaging pulse sequence.

[c4] 4.The method of claim 3 further comprising the step of initially selecting a desired plane for MR data acquisition through an anatomic region of interest, and as the subject traverses through a magnet iso-center, allowing operator adjustment of at least one of a number of sections imaged, section spacing, section scan locations, and imaging plane.

[c5] 5.The method of claim 1 further comprising providing an ability to interrupt scanning after identifying an abnormality of interest, reversing the movable table and acquiring high spatial resolution image data.

[c6] 6.The method of claim 5 wherein the abnormality of interest is a tumor and further comprises the steps of acquiring functional images and characterizing the tumor using one of contrast media uptake, diffusion, and multi-parametric

imaging.

[c7] 7.The method of claim 1 further comprising tailoring acquisition plane and spatial coverage to each anatomical region desired during MR image acquisition in real-time.

[c8] 8.The method of claim 1 further comprising allowing continuous variation of imaging parameters including transmitter/receive gains and localized shimming.

[c9] 9.The method of claim 1 further comprising obtaining multiple images of a same anatomical region to decrease false positive possibilities.

[c10] 10.An MRI apparatus with sensitive whole body screening ability comprising:

a magnetic resonance imaging (MRI) system having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images;

a table movable under computer control within the bore of the magnet;

a computer programmed to:

receive initial scan parameters and table translation parameters;

translate the table;

acquire MR data while the table translates;

allow reception of user input during table translation and if so received, modify translation in response thereto; and

allow reception of user input of scan parameters and if so received, modify MR data acquisition in response thereto.

[c11] 11.The MRI apparatus of claim 10 wherein MR data is acquired continuously during table translation.

[c12] 12.The MRI apparatus of claim 10 wherein table translation is approximately 0.5 cm/sec. and scan times are approximately one second to thereby reduce motion artifacts.

[c13] 13.The MRI apparatus of claim 10 wherein the computer is further programmed

to allow user-selectable fat suppression and when selected, apply an intermittent fat suppression RF pulse.

[c14] 14.The MRI apparatus of claim 10 wherein the computer is further programmed to monitor flow of an intravenous contrast agent.

[c15] 15. The MRI apparatus of claim 10 wherein the computer is further programmed to acquire data of a region of abnormality in multiple planes in real-time.

[c16] 16.The MRI apparatus of claim 10 wherein the computer is further programmed to allow manipulation of at least one of image obliquity, table speed, table direction, and pulse sequence parameters such as inversion time, flip angle, and sequence type in real-time.

[c17] 17.The MRI apparatus of claim 10 wherein the computer is further programmed to acquire functional images and allow characterization of ~~lesions in real-time~~.

[c18] 18.The MRI apparatus of claim 10 wherein the computer is further programmed to vary transmitter gain, receiver gain, and shimming on demand by a user.

[c19] 19.A computer readable storage medium having stored thereon a computer program comprising instructions which, when executed by a computer, cause the computer to:

move a patient table through an MR scanner and simultaneously acquire MR data; and

allow user input and in response thereto, manipulate at least one of patient table speed, direction, and scan parameters.

[c20] 20.The computer readable storage medium of claim 19 wherein the computer is further caused to acquire data of an abnormality in various planes and reconstruct functional images to characterize the abnormality in real time.

[c21] 21.The computer readable storage medium of claim 19 wherein the computer is further caused to allow manipulation of at least one image obliquity, table speed, table direction, and pulse sequence parameters, such as inversion time, flip angel, and sequence type and wherein the computer is further caused to vary transmitter gain, receiver gain, and shimming on demand by a user.

[c22] 22.The computer readable storage medium of claim 19 wherein the computer is further caused to allow user-selectable fat suppression and when selected, apply an intermittent fat suppression RF pulse.

[c23] 23.A method of identifying a tumor in a patient comprising:
placing a patient on a movable table;
translating the movable table and acquiring MR data as the patient moves through a magnetic field;
reconstructing MR images of patient anatomy as the movable table is translating;
analyzing the MR images and if an area of interest is identified for further study, returning the movable table such that the area of interest is within the magnetic field and modifying MR data acquisition parameters in real-time; and
acquiring one of higher resolution MR data and differing plane MR data to allow further analysis of the area of interest.

[c24] 24.The method of claim 23 further comprising injecting a contrast media to monitor contrast uptake by various anatomy.

[c25] 25.The method of claim 23 further comprising applying fat suppression for tumor identification.

[c26] 26.The method of claim 23 wherein MR data acquisition is performed at magnet iso-center to optimize resolution of MR data acquired of a moving patient.

[c27] 27.The MR apparatus of claim 10 wherein the computer applies one of an inversion recovery fast gradient echo (IR-prep) and a fast imaging employing steady-state acquisition (FIESTA) pulse sequence.

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information known to the Applicant(s) which may be considered material to the patentability of the claims of the above-captioned application. One copy of each reference is attached.

Applicants would like to make the Examiner aware that the following pending U.S. patent applications might be considered relevant to the examination of this application:

U.S. Ser. No. 09/292,548 filed April 15, 1999; — 6425864

U.S. Ser. No. 10/098,013 filed March 13, 2002; — 6643534

U.S. Ser. No. 09/591,300 filed June 9, 2000; 6408201

U.S. Ser. No. 09/682,699 filed October 5, 2001; F.R.

U.S. Ser. No. 10/147,701 filed May 17, 2002; 6,707,300

U.S. Ser. No. 09/595,117 filed June 16, 2000; and Pat

U.S. Ser. No. 09/681,420 filed March 31, 2001. F.R.

The Applicants respectfully request that the documents listed on the attached equivalent to Form PTO-1449 be considered by the Examiner, that the references be made of record in the present application, and that an initialed copy of the duplicate equivalent to Form PTO-1449 be returned to the undersigned in accordance with MPEP 609.

Respectfully submitted,

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